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# PROCESSING CARROT & CABBAGE CULTIVAR EVALUATIONS - 1997

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# 1997 PROCESSING CABBAGE CULTIVAR EVALUATION

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**Objective:** To compare yield and quality of commercially available cultivars for processing cabbage production in northwestern Ohio.

**Materials and methods:** Twenty cultivars or advanced breeding lines of cabbage were evaluated for processing cabbage production at the OARDC Vegetable Crops Branch near Fremont in northwestern Ohio. Cultivars which are widely grown by local growers were included in the trial for comparison purposes. Transplants were seeded into 288-deep square plug trays in the greenhouse on April 15. A continuous feed fertilizer solution of 50 ppm N was supplied after the first true leaf emerged. Plants were hardened-off prior to field planting. Each cultivar was planted into conventionally tilled, Kibbie fine sandy loam soil on June 20 with a "carousel" type transplanter. Each treatment consisted of two 30 in. rows, 30 ft. long with plants spaced 18 in. apart in a randomized complete block design with four replicates. The fertility program consisted of 400 lb/A 0-14-42 and 200 lb/A 34-0-0 broadcast and incorporated prior to planting. A sidedress application of 7gal/A of 28% UAN solution (21 lb N/A equivalent) was injected between rows on July 8. Weeds were controlled with 1.0 pt/A Treflan MTF pre-plant incorporated, along with mechanical cultivation and hand hoeing. Insects and diseases were controlled with crop protection chemicals at labeled rates. No irrigation water was applied as rainfall was adequate during the growing season. Each cultivar was harvested after the majority of heads reached mature size and firmness, and when a few heads began to split. All heads with diameters above five inches were harvested, and the total number and weight was recorded. The amount of culled heads due to splitting or head rot was also tallied. Cultivars were rated for field uniformity, uprightness, and plant (frame) size. A sample of three heads per treatment was cut to measure diameter and core length. Observations were also noted for mid-rib size, color, density and any defects. The sample was trimmed to remove cabbage damaged by onion thrips feeding. The amount of trimmed cabbage was weighed to give a measure of thrips tolerance for each cultivar. The cultivars were rated for the tightness of which the outer leaves covered the head. The outer leaves of some cultivars tend to be thin or brittle, and loosely cover the head. Local growers and processors have reported that some cultivars "shatter"excessively, resulting in lost yield. Cultivars can shatter as a result of the action of cleaning rolls on mechanical harvesters, the impact which cabbage receives as it falls onto a truck bed, or from unloading and handling at processing plants.

**Discussion and Results:** A cooler than average summer allowed for good growth and development of the cabbage crop (Table 1). The cool weather caused many cultivars to mature and hold up well for several weeks. Cultivars which resist splitting and head rot for several weeks past maturity provide growers and processors with a longer "harvest window". A procedure used in this trial has

***Acknowledgments:*** The financial support of contributing seed companies and the Ohio Vegetable and Small Fruit Research and Development Program is greatly appreciated.

been to delay the harvest evaluation until some heads of a cultivar begin to split, which gives an indication of how well a hybrid can hold up under field conditions. Growers reported a long harvest period this season with high yields and excellent quality. Titanic-90, an early season standard, looked good well into October in this trial. Damage caused by onion thrips was low in 1997. In previous OSU evaluations, susceptible cultivars had damaged leaves extending more than 2 to 3 inches deep, whereas in 1997 those same cultivars showed little damage. Early season cultivars that performed well in terms of quality and yield included Almanac, and Titanic-90. Fresco, an early high yielding hybrid, performed well for the last 3 years. Unfortunately, Fresco has brittle outer leaves which shatter easily. Pruktor is a new entry to this trial. It showed good yield potential for an early to mid-season harvest. Pruktor had a tendency to shatter with an average rating of 2.0, and warrants additional study under more seasonal weather conditions. Megaton had the highest overall yield and head size of later maturing entries, but had a high amount of thrips injury. A more complete report will be made available at the Ohio Fruit and Vegetable Growers Congress in February 1998.

**Table 1. Weather data. OARDC Vegetable Crops Branch, Fremont, Ohio - 1997.**

| Month | Temperature (°F) | | | | Precipitation (in.) | |
|---|---|---|---|---|---|---|
| | Av Min | Av Max | Monthly Average | Long-term Average | Monthly Total | Long-term Average |
| May | 41.0 | 63.7 | 52.3 | 59.2 | 5.89 | 3.64 |
| June | 57.4 | 78.3 | 67.8 | 69.1 | 4.64 | 3.97 |
| July | 58.7 | 81.7 | 70.2 | 72.8 | 2.53 | 3.86 |
| August | 54.9 | 77.5 | 66.2 | 70.7 | 4.08 | 3.39 |
| September | 48.4 | 74.2 | 61.3 | 63.7 | 2.69 | 3.01 |
| October | 38.1 | 63.9 | 51.0 | 52.2 | 1.68 | 2.47 |
| Total | --- | --- | --- | --- | 21.51 | 20.34 |

**Table 2. Yield and head characteristics of processing cabbage cultivars[1]. Fremont, OH - 1997.**

| Cultivar | Source[2] | Harvest Data | | | | Head Measurements (in.) | | |
|---|---|---|---|---|---|---|---|---|
| | | Harvest Date | Yield ton/A | head sz lb/head | Percent Cut[3] | Core Length | Polar Diameter | Equator-ial Diam. |
| Almanac | BZ | 9-11 | 35.3 | 6.6 | 89.4 | 2.9 | 7.8 | 7.7 |
| Discover | BZ | 10-29 | 45.8 | 7.9 | 97.5 | 2.6 | 7.5 | 8.0 |
| Fresco | BZ | 9-11 | 34.6 | 5.9 | 97.6 | 3.0 | 7.2 | 7.6 |
| Megaton | BZ | 10-29 | 50.2 | 8.8 | 93.1 | 1.8 | 8 | 8.2 |
| Score | BZ | 10-29 | 46.2 | 7.8 | 94.2 | 2.9 | 7.5 | 7.8 |
| Transam | BZ | 10-29 | 38.9 | 6.2 | 100 | 3.2 | 7.0 | 7.4 |
| Azan | PS | 10-29 | 43.6 | 7.3 | 100 | 3.6 | 7.4 | 8.0 |
| Atlantis | PS | 9-11 | 26.3 | 5.1 | 94.1 | 2.5 | 7.2 | 7.2 |
| Galaxy | PS | 10-29 | 26.5 | 4.4 | 100 | 2.9 | 6.3 | 6.8 |
| Thunder Bay | PS | 10-29 | 35.2 | 6.3 | 89.5 | 2.4 | 7.3 | 7.6 |
| RS 903005 | PS | 10-29 | 48.1 | 7.9 | 100 | 3.1 | 7.3 | 8.0 |
| Pruktor | D | 10-29 | 35.2 | 8.4 | 73.6 | 2.7 | 7.7 | 8.1 |
| Bravo | HM | 10-29 | 38.3 | 7.9 | 83.8 | 3.1 | 7.0 | 8.3 |
| Applause | HM | 9-15 | 32.2 | 6.2 | 95.9 | nd | nd | nd |
| Blue Thunder | HM | 10-29 | 31.1 | 6.4 | 78.7 | 3.0 | 6.9 | 7.8 |
| Cheers | AT | 10-29 | 44.5 | 8.1 | 96.1 | 3.1 | 7.4 | 8.3 |
| Titanic 90 | FM | 10-29 | 39.9 | 7.8 | 83.6 | 3.2 | 6.8 | 8.1 |
| FMX 551 | FM | 10-29 | 27.3 | 5.3 | 84.6 | 2.3 | 7.1 | 7.2 |
| Fortress | FM | 9-11 | 34.6 | 6.8 | 85.6 | 3.1 | 6.7 | 8.0 |
| Grandslam | RG | 10-29 | 36.5 | 7.9 | 76.1 | 2.6 | 7.0 | 8.8 |
| **AVERAGE** | -- | -- | 37.5 | 7.0 | 89.2 | 2.7 | 6.9 | 7.4 |

**1 - Each value is the mean of four replicates.**
**2 - Seed donated by Bejo Zaden (BZ), Petoseed (PS), Daehnfelt (D), Harris Moran (HM), American Takii (AT), Ferry-Morse (FM), and Rogers Seed (RG).**
**3 - Percent Cut indicates the proportion of marketable sized heads harvested. Split, rotten or small heads (<5 in.) are not marketable.**
**nd - no data**

**Table 3. Thrips damage and plant characteristics of processing cabbage cultivars[1]. Fremont, OH - 1997.**

| Cultivar | Source | Thrips Damage | | Shatter Rating (1-3) | Plant Characteristics | | | |
|---|---|---|---|---|---|---|---|---|
| | | Rating (1-5) | Cull wt. (lbs.) | | Head Shape | Uniformity (1-5) | Frame Size | Uprightness |
| Almanac | BZ | 2.0 | 1.8 | 1.1 | Round | 1 | Med.-small | Sl. tipped |
| Discover | BZ | 1.8 | 2.5 | 1.3 | Round | 1 | Med.-large | Sl. tipped |
| Fresco | BZ | 1.0 | 0.0 | 2.5 | Round | 1 | Medium | Sl. tipped |
| Megaton | BZ | 3.0 | 4.3 | 1.4 | Round | 1 | Med.-large | Sl. tipped |
| Score | BZ | 2.1 | 3.2 | 1.3 | Round | 2 | Med.-large | Tipped |
| Transam | BZ | 1.4 | 2.8 | 1.0 | Sl. Flat | 1 | Large | Upright |
| Azan | PS | 3.5 | 5.0 | 1.0 | Sl. Pointed | 2 | Med.-large | Upright |
| Atlantis | PS | 1.8 | 1.6 | 1.5 | Rd. to sl. Flat | 2 | Small | Very tipped |
| Galaxy | PS | 1.8 | 2.3 | 1.0 | Sl. Pointed | 1 | Med.-large | Upright |
| Thunder Bay | PS | 1.8 | 2.1 | 2.5 | Round | 1 | Med.-large | Sl. tipped |
| RS 903005 | PS | 2.6 | 3.5 | 1.5 | Both Fl. & Rd. | 2 | Med.-large | Upright |
| Pruktor | D | 2.0 | 3.4 | 2.0 | Round | 1 | Medium | Upright |
| Bravo | HM | 1.3 | 1.7 | 2.5 | Flat | 1 | Large | Sl. tipped |
| Applause | HM | nd | nd | 1.5 | Round | 2 | Med.-large | Tipped |
| Blue Thunder | HM | 1.9 | 2.1 | 2.5 | Flat | 1 | Med.-large | Sl. tipped |
| Cheers | AT | 1.6 | 2.1 | 1.9 | Sl. Flat | 1 | Large | Tipped |
| Titanic 90 | FM | 1.3 | 1.9 | 1.8 | Flat | 3 | Medium | Tipped |
| FMX 551 | FM | 1.9 | 1.7 | 1.3 | Round | 2 | Med.-small | Tipped |
| Fortress | FM | 2.0 | 2.4 | 1.9 | Flat | 3 | Medium | Tipped |
| Grandslam | RG | 1.6 | 2.4 | 2.4 | Flat | 2 | Large | Tipped |
| **AVERAGE** | -- | 1.9 | 2.3 | 1.3 | -- | -- | -- | -- |

**1 - Each value is the mean of four replicates.**

**Ratings:**

**Thrips injury 1=none, 2=present on outer wrapper leaves, 3=several layers deep, 5=heavy damage more than 2 inches deep**

**Shatter Rating: 1=tightly wrapped, 3=outer leaves easily break and peel off**

**Uniformity: 1=Excellent, 3=good, 5=poor**

**Table 4. Internal characteristics and comments of processing cabbage cultivars. - Fremont, OH 1997**

| Cultivar | Source | Head Density | Midrib Size | Internal Color | Comments |
|---|---|---|---|---|---|
| Almanac | BZ | VD | M | White | Early, uniform, stands & holds well, very dense, short plant |
| Discover | BZ | VD | M | White | Short core, dense, good quality |
| Fresco | BZ | VD | M | White | Round, v. dense, medium frame, some perimeter internal green |
| Megaton | BZ | D | MS | White | Dense, some thrips injury, shortest core, large head size |
| Score | BZ | VD | M | White | Very dense, med. frame, medium core, large heads |
| Transam | BZ | VD | S | White | Small heads, long & fat core, very dense, light thrips injury |
| Azan | PS | VD | M | White | Fat core, very dense, high thrips injury, |
| Atlantis | PS | VD | M | White | Very dense, short core, dark green foliage, small frame |
| Galaxy | PS | VD | S | Cream | Very small heads, med core, very dense, did not mature |
| Thunder Bay | PS | VD | M | White | Dense, short core, no thrips injury, may shatter easily |
| RS 903005 | PS | VD | M | White | Fat core, some thrips injury, very dense |
| Pruktor | D | VD | M | White | Very dense, short fat core, large head sz, earlier mid-seaosn |
| Bravo | HM | D | MS | White | Flat heads, long core, may shatter, some internal buds, head rot |
| Applause | HM | -- | -- | White | Error in taking data (no comment) |
| Blue Thunder | HM | VD | MS | White | Thick long core, may shatter, very dense |
| Cheers | AT | C | S | White | Coarse, white interior, small basal buds |
| Titanic 90 | FM | D | M | White | Dense, variably shaped heads, long core, white interior |
| FMX 551 | FM | VD | M | Lt. Green | Many splitting cores, very dense, short core, small frame, flat |
| Fortress | FM | VD | S | White | Fairly long narrow core, very dense, white interior, flat |
| Grandslam | RG | C | S | White | Large heads, coarse interior, short core, may shatter, head rot |

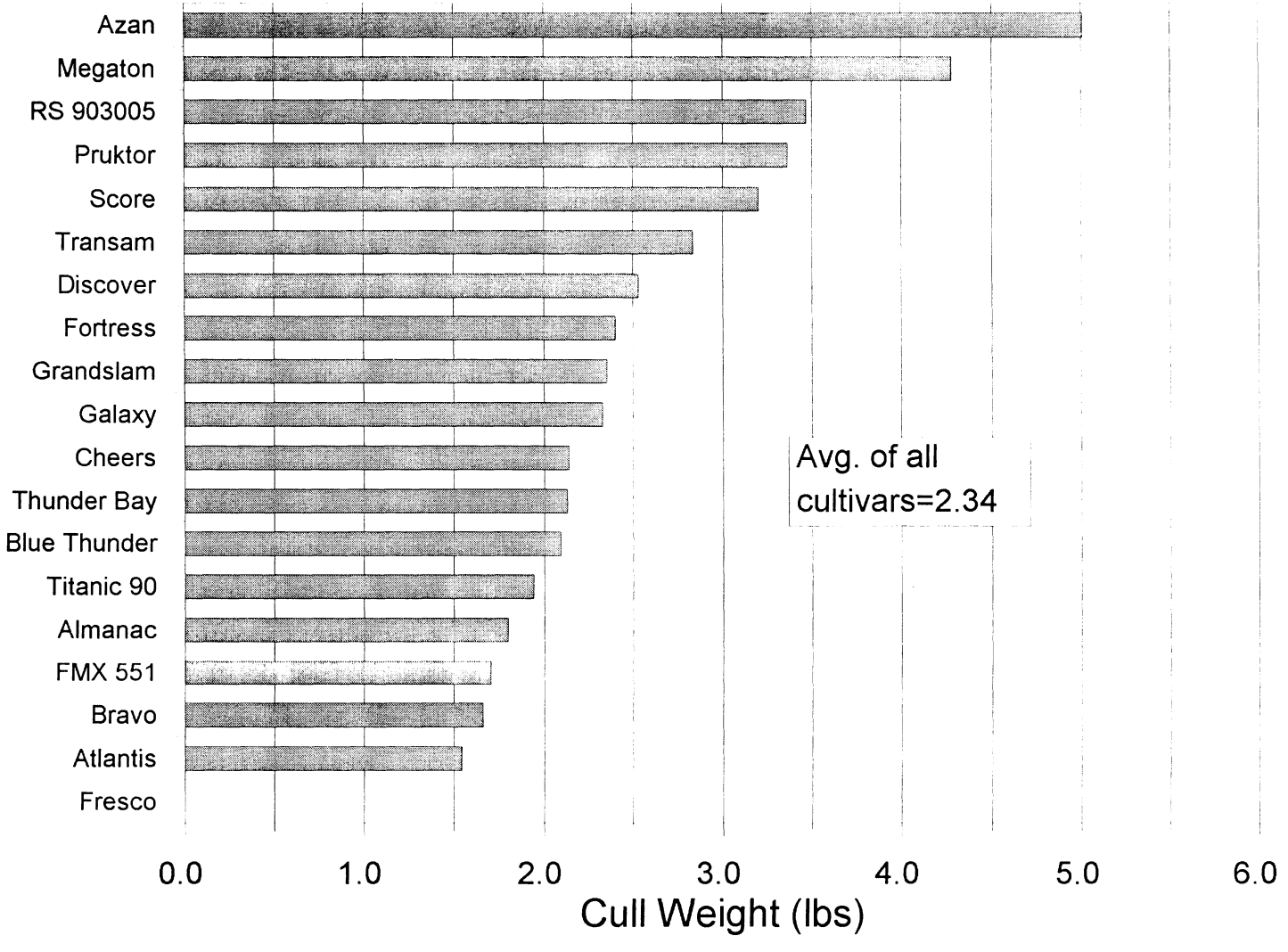
**Head Density - Very Dense, Course**
**Midrib Size - Medium, Small, Large**

Table 5. Average yield and head characteristics of processing cabbage cultivars entered in replicated trials from 1993 to 1997. OARDC - Fremont, Ohio.

| Cultivar | Source | Yield ton/A | Head wt. lbs/head | Core lgth. | Polar diameter | Equatorial diameter |
|---|---|---|---|---|---|---|
| | | | | ----------inches---------- | | |
| **Five Year Average** | | | | | | |
| Almanac | BZ | 33.7 | 7.2 | 2.9 | 7.8 | 7.9 |
| Megaton | BZ | 35.7 | 6.7 | 1.8 | 7.6 | 7.7 |
| Transam | BZ | 32.2 | 5.8 | 3.1 | 6.8 | 7.1 |
| Titanic-90 | FM | 31.8 | 6.4 | 3.4 | 6.7 | 8.0 |
| **Mean** | | 33.3 | 6.5 | 2.8 | 7.2 | 7.7 |
| **Four Year Average** | | | | | | |
| Cheers | AT | 38.7 | 6.9 | 3.3 | 7.3 | 8.4 |
| Cecile | BZ | 26.6 | 4.9 | 2.5 | 6.8 | 7.1 |
| Hinova | BZ | 32.8 | 5.8 | 2.8 | 6.9 | 7.4 |
| Masada | BZ | 28.3 | 5.3 | 3.0 | 7.1 | 7.2 |
| Fortress | FM | 26.9 | 5.3 | 3.3 | 6.6 | 7.8 |
| King Cole | FM | 25.1 | 5.5 | 4.1 | 7.2 | 7.6 |
| Bravo | HM | 37.7 | 7.3 | 3.2 | 6.9 | 8.4 |
| Grandslam | SK/RG | 38.9 | 7.7 | 3.0 | 7.5 | 9.0 |
| **Mean** | | 31.9 | 6.1 | 3.1 | 7.0 | 7.8 |
| **Three Year Average** | | | | | | |
| Discover | BZ | 34.1 | 6.0 | 2.6 | 7.1 | 7.5 |
| Fresco | BZ | 33.6 | 6.3 | 3.2 | 7.4 | 7.7 |
| Blue Thunder | HM | 30.5 | 6.0 | 3.3 | 7.0 | 7.9 |
| Coleguard | HM | 33.4 | 6.5 | 3.3 | 6.8 | 7.8 |
| HMX 1257 | HM | 30.6 | 6.3 | 2.6 | 7.0 | 7.5 |
| Azan | PS | 35.7 | 6.2 | 3.4 | 7.1 | 7.5 |
| Thunder Bay | PS | 30.8 | 5.6 | 2.3 | 7.0 | 7.4 |
| Atria | PS | 34.9 | 6.7 | 3.2 | 7.5 | 7.7 |
| **Mean** | | 32.9 | 6.2 | 3.0 | 7.1 | 7.6 |

# Thrips Damage to Cabbage Cultivars

## OARDC Fremont, OH - 1997



# 1997 Evaluation of Processing Carrot Cultivars

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**OARDC Vegetable Crops Branch**
**The Ohio State University**
**Fremont, Ohio**

**Objective:** Seventeen carrot cultivars or advanced breeding lines were obtained from seed companies and evaluated at the OARDC Vegetable Crops Branch near Fremont in Sandusky County, Ohio. Cultivars which are widely grown were included in the trial for comparison purposes. A "multiple harvest trial" was planted to evaluate yield and quality for carrots grown for juiced products over three harvest dates (Aug.12, Sep.12, and Oct. 15). In addition a long-season "processing trial" compared yield and quality of cultivars grown for diced or sliced products. The processing trial was harvested once on Nov. 5.

**Materials and methods:** Six inch high raised beds on 60 inch centers were established with a Johnson Power Bedder in mid-April on Kibbie fine sandy loam soil. Fertilizers incorporated into the beds were 118 lb/A 34-0-0 and 500 lb/A 0-14-42. Each cultivar was seeded on April 30 with a cone-type research seeder. Each treatment consisted of a single bed with two rows 20 in. apart, 35 ft. long in a randomized complete block design over three replicates. Seeding rates were adjusted for each cultivar according to percent germination to achieve similar emergence. The plots were hand-thinned after emergence to achieve 3/4 inch between plants (16 plants/ft.) in the multi-harvest trial, and 1.5 inches between plants (8 plants/ft.) in the processing trial. Weeds were controlled with 1.5 pt/A Treflan MTF (trifluralin, 4 lb/gal., PPI), and 2.0 lb/A Linex (linuron, 50%, post-applied), along with mechanical cultivation and hand hoeing. Timely applications of crop protection chemicals were applied at labeled rates to control diseases and insects. A representative area was hand dug in each treatment for each harvest date. Plant height was measured and the number of bolted plants was counted. The roots were separated into usable and cull categories. The usable roots were separated by their diameters as follows: small (less than 3/4 in.), medium (3/4 to 1.5 in.), and large (greater than 1.5 in.). The culled roots were sorted according to their defect as follows: forked, cracked, mis-shapen, rotted, and insect or animal damage. The number and weight of all roots in each category was tabulated. Average length and diameter was measured from a sample of ten roots. Soluble solids (degrees Brix) were measured with a Reichert model 10430 hand-held refractometer to give a measure of sugar content at the Aug. 12 and Nov. 5 harvests. Juice was obtained by squeezing cross-sectioned carrot shavings in a garlic press.

**Discussion and Results:** The quality of carrots from research plots grown on flat ground at this location in 1980 was very poor, with many forked and cracked roots. Therefore, it was decided to establish this trial on raised beds. The raised beds also saved this trial from severe stand losses, since heavy rains occurred during seedling development. A cool, wet spring delayed establishment of the trial until soil conditions improved in late April. High winds over 30 miles/hour at planting caused the seeds to move out of the planter's belt-cone seed distributing units. As a result, the multi-harvest trial had several plots with poor seed placement. The problem was solved prior to planting the processing trial by installing a cardboard wind-shield to the planter. Emergence was slow due to cold, wet soil conditions. Stands were more than adequate and all plots were hand thinned. Temperatures were below average, and rainfall was generally adequate during the growing season. The plots grew

well, and no serious weed, disease, or insect problems were observed. The first harvest was delayed by two weeks due to the slow crop development.

Carson, Fayette, Nandrin, Napa, and Gold King had the five highest usable yields at the Aug. 12 harvest (Table 1a.). The total yield of Petoseed's PX2890 and PX2590 was in excess of 15 ton/A. However, both of these entries had greater than 20% of roots with growth cracks. Entries with the strongest top-growth were Calgary, PX2590, Carson, SDC1374, and SDC1443. At the second harvest on Sep. 12, both PX2890 and PX2590 had fewer cracked roots, which resulted in greater usable yield, 15.5 and 26.1 ton/A respectively (Table 2). Some cultivars had variable areas of poor quality roots within the row, which resulted in lower % forked and cracked roots harvested for PX2890 and PX 2590 on Sep. 12. Table 4 shows the average yield over the three harvest dates. Average total yields over 30 ton/A were obtained from PX2590, Gold King, Nandrin, SDC1443 and PX2890. Average usable yields over 22 tons/A were obtained from Carson, SDC1443, PX2590, Calgary, Kamaran and SDC1682. Cultivars which had the greatest % forked or cracked roots were SDC1374, Nashville, Napa, Early Gold, PX2890 and PX2590. Soluble solids increased from an average 6.8 on August 12, to 8.9 degrees Brix on Nov. 5 (Tables 1a, 5a).

In the long season processing trial, a larger plot area was harvested which gave a more representative sample to evaluate. Usable yields over 30 ton/A were achieved for Gold King, SDC1443, and Kamaran (Table 5a). Total yields over 40 ton/A were achieved for Gold King, PX2590, Napa, Carson, Kamaran, and Nevis. Several cultivars had over 20% forked or cracked roots including PX2890, PX2590, Napa, Nevis, and SDC1374.

**Overall Impression:** This is the first time carrots have been evaluated at this location since 1980. The sandy loam soils at the Vegetable Crops Branch are not the most ideal for carrot production, as shown in the high percentage of forked or cracked roots. However, using raised beds helped this situation to a great degree. It is hoped that with less than "ideal" soil conditions, some of the better performing cultivars might stand out from the rest. Growers who read this report might be alarmed by the high yields which we achieved. This commonly occurs in research plot data. One should interpret the data by comparing cultivars one to another, or to a standard cultivar. Also, since a statistical analysis was not performed, one must interpret the data in rather broad terms. For additional information on interpreting research data, refer to an article published in the *Great Lakes Vegetable Growers News*, "Why grower yields don't match those in research plots", Dec.1997, p. 17.

***Acknowledgements:*** We want to acknowledge several people who have given us advice and assistance in the establishment of this trial including: Sean Mueller, Agriculture Technician, OARDC; David Silveus, Petoseed Company; David Kelly, Ohio Potato Growers Assn.; Charles Weber, Campbell Soup Co., and growers who gave us their ideas and input. This trial was made possible by a grant from the **Ohio Vegetable and Small Fruit Research and Development Program.** Seeds were donated by the cooperating seed companies.

Table 1a. Yield and Characteristics of Processing Carrot Cultivars harvested on August 12. OARDC, Fremont, Ohio - 1997

| | | ----------Size---------- | | | --------Cull--------- | | | | | | | --------Yield------- | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | Source | % Small | % Medium | % Large | % Forks | % Cracks | Length in. | Diameter in. | % Bolted | Plant Ht. in. | Stand plants/ft | Ton/A Total | Ton/A Usable |
| SDC 1374 | CP | 3.0 | 73.8 | 23.2 | 8.3 | 3.3 | 6.2 | 1.3 | 0.0 | 22.8 | 8.6 | 12.0 | 10.1 |
| SDC 1443 | CP | 1.6 | 72.5 | 25.8 | 7.0 | 4.5 | 5.8 | 1.3 | 0.0 | 22.5 | 10.1 | 14.0 | 11.7 |
| SDC 1682 | CP | 1.8 | 79.0 | 19.2 | 7.2 | 8.4 | 6.1 | 1.2 | 0.5 | 22.1 | 8.2 | 12.1 | 9.1 |
| Calgary | BZ | 3.1 | 61.8 | 35.2 | 9.2 | 3.0 | 6.1 | 1.3 | 0.6 | 25.3 | 7.1 | 10.5 | 8.4 |
| Carson | BZ | 1.2 | 63.2 | 35.5 | 5.3 | 0.2 | 4.9 | 1.3 | 0.0 | 24.8 | 8.9 | 15.0 | 12.3 |
| Fayette | BZ | 1.7 | 84.1 | 14.1 | 4.3 | 0.9 | 6.8 | 1.2 | 0.0 | 21.3 | 8.8 | 13.7 | 11.5 |
| Ireland | BZ | 1.9 | 83.9 | 14.2 | 9.2 | 5.7 | 8.0 | 1.2 | 0.0 | 19.7 | 6.7 | 10.8 | 9.0 |
| Kamaran | BZ | 2.7 | 87.4 | 9.8 | 11.5 | 3.7 | 6.8 | 1.2 | 0.3 | 20.1 | 9.3 | 14.2 | 9.9 |
| Nandrin | BZ | 1.0 | 87.9 | 11.1 | 4.7 | 2.9 | 6.9 | 1.3 | 0.0 | 19.9 | 7.3 | 13.6 | 10.9 |
| Napa | BZ | 2.8 | 87.7 | 9.5 | 4.3 | 8.1 | 6.5 | 1.2 | 0.0 | 19.9 | 9.7 | 18.4 | 10.6 |
| Nashville | BZ | 3.4 | 93.1 | 3.5 | 11.0 | 8.1 | 7.6 | 1.1 | 0.2 | 21.8 | 8.2 | 13.4 | 9.4 |
| Nevis | BZ | 3.5 | 90.9 | 5.7 | 4.5 | 6.1 | 6.3 | 1.1 | 0.0 | 19.9 | 9.8 | 14.2 | 10.3 |
| Goliath | PS | 1.5 | 82.6 | 15.9 | 6.5 | 9.2 | 6.0 | 1.3 | 0.3 | 21.8 | 8.8 | 12.7 | 10.1 |
| Early Gold | PS | 0.6 | 59.8 | 39.5 | 9.2 | 15.7 | 6.0 | 1.4 | 0.9 | 22.0 | 5.0 | 10.2 | 7.2 |
| Gold King | RG | 1.8 | 57.0 | 41.1 | 7.2 | 10.9 | 5.8 | 1.3 | 0.2 | 20.3 | 9.5 | 13.9 | 10.5 |
| PX 2890 | PS | 0.8 | 70.3 | 28.9 | 4.2 | 23.5 | 5.1 | 1.4 | 0.9 | 21.4 | 9.3 | 15.4 | 9.4 |
| PX 2590 | PS | 0.6 | 42.2 | 57.2 | 8.6 | 25.0 | 4.9 | 1.5 | 0.0 | 25.0 | 7.7 | 16.1 | 9.7 |
| | **Average** | 1.9 | 75.1 | 22.9 | 7.2 | 8.2 | 6.2 | 1.3 | 0.2 | 21.8 | 8.4 | 13.5 | 10.0 |

**Each value is the mean of 3 replicates.**

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**Size: % by weight. Small=diameter < 0.75 inch, Medium= 0.75 to 1.5 inch, Large=diameter>1.5 inch**

**Length and Diameter: sample of 10 roots / cultivar x 3 reps**

**Yield: These values should be interpreted as potential yield over an entire acre. Grower yields may differ due to variations in field conditions, cultural practices or other factors.**

Table 1b. Quality Characteristics of Processing Carrot Cultivars harvested on August 12. OARDC - Fremont, Ohio - 1997

| Variety | Source | Sol. Solids BRIX | -------Color-------- Cortex | Core | Smooth-ness | Comments |
|---|---|---|---|---|---|---|
| SDC 1374 | CP | 7.0 | 2 | 2 | 2 | Tapered, Uniform orange interior |
| SDC 1443 | CP | 6.7 | 2 | 3 | 2 | Medium size, tapered |
| SDC 1682 | CP | 6.8 | 2 | 3 | 1 | Center of core is dark orange, tapered, uniform, broad shoulder |
| Calgary | BZ | 6.8 | 2 | 2 | 2 | Medium size, tapered |
| Carson | BZ | 7.2 | 2 | 2 | 2 | Short, tapered, some crooked roots |
| Fayette | BZ | 7.0 | 2 | 2 | 2 | Slender, tapered, some crooked roots |
| Ireland | BZ | 7.0 | 2 | 2 | 2 | Slender, straight, very uniform |
| Kamaran | BZ | 6.8 | 2 | 2 | 2 | Medium size, some tapered, variable shapes |
| Nandrin | BZ | 6.3 | 2 | 2 | 2 | Large, uniform thickness, blunt end, some crooked, pale cambium |
| Napa | BZ | 6.8 | 2 | 3 | 3 | Slender, tapered |
| Nashville | BZ | 7.3 | 2 | 2 | 2 | Slender, straight |
| Nevis | BZ | 7.2 | 2 | 3 | 2 | Medium size, long, tapered end |
| Goliath | PS | 6.3 | 2 | 3 | 2 | Slender, small size |
| Early Gold | PS | 7.0 | 2 | 3 | 2 | Dark core center, medium to small, tapered, straight |
| Gold King | RG | 6.0 | 2 | 2 | 3 | Broad shoulder, tapered, pale cambium |
| PX 2890 | PS | 6.8 | 2 | 3 | 1 | Broad shoulder, short, tapered, blunt end, red-orange core |
| PX 2590 | PS | 6.3 | 2 | 3 | 3 | Broad shoulder, short, some crooked, blunt end, internal green 1 inch deep |
| | **Average** | 6.8 | | | | |

**Ratings: Cultivars are compared one to another (they do not reflect best or worst case situations)**

**Color: 1=light orange, 2=medium orange, 3=dark orange**

**Smoothness: 1=smooth, 2=medium, 3=rough**

**Soluble solids: Average of three readings**

**Juice was obtained by squeezing carrot shavings in a garlic press.**

**Degrees Brix was measured with a Reichert Model 10430 hand held refractometer.**

Table 2. Yield and Characteristics of Processing Carrot Cultivars harvested on September 12. OARDC, Fremont, Ohio - 1997

| | | ----------Size---------- | | | --------Cull--------- | | | | | | --------Yield------- | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | Source | % Small | % Medium | % Large | % Fork | % Crack | Length in. | Diameter in. | % Bolted | Stand plants/ft | Ton/A Total | Ton/A Usable |
| SDC 1374 | CP | 0.4 | 29.3 | 70.3 | 17.3 | 3.7 | 6.6 | 1.7 | 3.1 | 7.7 | 25.5 | 15.1 |
| SDC 1443 | CP | 0.0 | 21.8 | 78.2 | 8.9 | 3.9 | 6.3 | 1.9 | 1.0 | 10.0 | 32.4 | 23.7 |
| SDC 1682 | CP | 0.3 | 31.7 | 68.0 | 13.3 | 2.8 | 7.2 | 1.8 | 0.8 | 10.2 | 30.9 | 21.3 |
| Calgary | BZ | 0.3 | 24.9 | 74.8 | 4.5 | 3.3 | 6.4 | 2.0 | 3.0 | 9.0 | 33.0 | 27.9 |
| Carson | BZ | 0.0 | 13.9 | 86.1 | 8.5 | 0.1 | 5.9 | 1.9 | 0.8 | 9.3 | 31.3 | 27.2 |
| Fayette | BZ | 0.0 | 48.8 | 51.2 | 6.3 | 0.8 | 8.3 | 1.6 | 0.0 | 10.9 | 32.2 | 23.1 |
| Ireland | BZ | 0.0 | 25.5 | 74.5 | 9.5 | 6.5 | 8.1 | 1.5 | 0.0 | 6.7 | 25.3 | 17.7 |
| Kamaran | BZ | 0.0 | 30.9 | 69.1 | 8.1 | 3.4 | 8.2 | 1.6 | 1.3 | 8.8 | 31.4 | 23.0 |
| Nandrin | BZ | 0.0 | 39.7 | 60.3 | 3.3 | 14.2 | 7.0 | 1.5 | 0.0 | 8.5 | 34.3 | 14.5 |
| Napa | BZ | 0.0 | 64.3 | 35.7 | 8.3 | 18.2 | 6.3 | 1.3 | 0.0 | 10.5 | 33.7 | 11.1 |
| Nashville | BZ | 0.0 | 68.4 | 31.6 | 17.1 | 1.4 | 7.5 | 1.3 | 0.6 | 12.4 | 28.8 | 19.2 |
| Nevis | BZ | 0.6 | 70.7 | 28.7 | 11.9 | 14.0 | 6.2 | 1.3 | 0.0 | 9.8 | 28.7 | 9.9 |
| Goliath | PS | 0.3 | 28.4 | 71.3 | 4.9 | 4.7 | 6.9 | 1.8 | 3.3 | 10.8 | 29.4 | 22.1 |
| Early Gold | PS | 0.0 | 4.6 | 95.4 | 8.9 | 17.8 | 7.6 | 2.1 | 7.5 | 5.3 | 26.2 | 15.1 |
| Gold King | RG | 0.0 | 11.3 | 88.7 | 15.0 | 5.2 | 6.5 | 2.0 | 0.0 | 8.4 | 34.6 | 17.9 |
| PX 2890 | PS | 0.0 | 25.4 | 74.6 | 11.8 | 8.0 | 5.8 | 1.7 | 17.9 | 10.3 | 33.3 | 15.5 |
| PX 2590 | PS | 0.0 | 9.5 | 90.5 | 13.9 | 6.0 | 5.9 | 2.1 | 0.0 | 8.4 | 38.7 | 26.1 |
| | **Average** | 0.1 | 32.3 | 67.6 | 10.1 | 6.7 | 6.9 | 1.7 | 2.3 | 9.2 | 31.2 | 19.4 |

**Each value is the mean of 3 replicates.**

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**Size: % by weight. Small=diameter < 0.75 inch, Medium= 0.75 to 1.5 inch, Large=diameter>1.5 inch**

**Length and Diameter: sample of 10 roots / cultivar x 3 reps**

**Yield: These values should be interpreted as potential yield over an entire acre. Grower yields may differ due to variations in field conditions, cultural practices or other factors.**

Table 3. Yield and Characteristics of Processing Carrot Cultivars harvested on October 15. OARDC, Fremont, Ohio - 1997

| | | ----------Size---------- | | | --------Cull-------- | | | Crown | Diameter | | --------Yield------- | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | % | % | % | % | Length | Diameter | 6" below | Stand | Ton/A | Ton/A |
| Variety | Source | Small | Medium | Large | Fork | Crack | in. | in. | crown | plants/ft | Total | Usable |
| SDC 1374 | CP | 0.0 | 20.3 | 79.7 | 11.5 | 1.2 | 8.0 | 2.2 | 1.3 | 9.9 | 35.8 | 29.5 |
| SDC 1443 | CP | 0.0 | 12.2 | 87.8 | 6.7 | 2.5 | 7.6 | 2.4 | 1.4 | 10.9 | 44.4 | 35.5 |
| SDC 1682 | CP | 0.0 | 25.4 | 74.6 | 7.3 | 0.0 | 8.3 | 2.0 | 1.3 | 9.2 | 42.3 | 36.1 |
| Calgary | BZ | 0.2 | 11.8 | 88.1 | 8.5 | 9.4 | 7.4 | 2.7 | 1.6 | 8.1 | 41.4 | 33.3 |
| Carson | BZ | 0.0 | 8.8 | 91.2 | 5.3 | 1.7 | 6.9 | 2.5 | 1.5 | 9.3 | 40.2 | 35.9 |
| Fayette | BZ | 0.4 | 23.4 | 76.3 | 5.8 | 1.7 | 8.4 | 2.0 | 1.5 | 11.1 | 39.2 | 32.5 |
| Ireland | BZ | 0.9 | 27.1 | 72.0 | 7.8 | 6.9 | 9.4 | 1.8 | 1.4 | 7.3 | 31.5 | 26.3 |
| Kamaran | BZ | 0.3 | 28.0 | 71.6 | 7.3 | 3.7 | 8.4 | 1.9 | 1.5 | 11.1 | 42.0 | 35.4 |
| Nandrin | BZ | 0.0 | 28.1 | 71.9 | 7.2 | 5.1 | 8.7 | 1.8 | 1.6 | 8.7 | 44.3 | 36.3 |
| Napa | BZ | 1.7 | 28.7 | 69.7 | 2.7 | 4.4 | 8.7 | 1.9 | 1.5 | 11.5 | 42.0 | 36.5 |
| Nashville | BZ | 0.0 | 25.6 | 74.4 | 14.4 | 6.9 | 9.1 | 1.8 | 1.4 | 10.9 | 39.8 | 28.5 |
| Nevis | BZ | 0.5 | 25.7 | 73.7 | 3.6 | 3.8 | 8.1 | 1.9 | 1.5 | 8.5 | 31.7 | 28.5 |
| Goliath | PS | 0.0 | 21.0 | 79.0 | 7.3 | 5.5 | 8.2 | 2.1 | 1.3 | 8.9 | 35.7 | 31.1 |
| Early Gold | PS | 0.0 | 2.6 | 97.4 | 20.4 | 3.4 | 8.2 | 2.6 | 1.7 | 5.5 | 36.0 | 26.1 |
| Gold King | RG | 0.7 | 9.4 | 89.9 | 4.5 | 3.2 | 7.4 | 2.5 | 1.6 | 9.7 | 45.8 | 39.4 |
| PX 2890 | PS | 0.8 | 14.3 | 84.9 | 7.5 | 8.8 | 7.1 | 2.4 | 1.4 | 9.8 | 42.0 | 28.2 |
| PX 2590 | PS | 0.5 | 1.0 | 98.6 | 13.1 | 0.9 | 6.9 | 2.6 | 1.6 | 8.1 | 47.9 | 34.4 |
| | **Average** | 0.3 | 18.4 | 81.2 | 8.3 | 4.1 | 8.0 | 2.2 | 1.5 | 9.3 | 40.1 | 32.6 |

**Each value is the mean of 3 replicates.**

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**Size: % by weight. Small=diameter < 0.75 inch, Medium= 0.75 to 1.5 inch, Large=diameter>1.5 inch**

**Length and Diameter: sample of 10 roots / cultivar x 3 reps**

**Yield: These values should be interpreted as potential yield over an entire acre. Grower yields may differ due to variations in field conditions, cultural practices or other factors.**

Table 4. Average Yield and Characteristics of Processing Carrot Cultivars over three harvest dates (August 12, September 12, and October 15). OARDC, Fremont, Ohio - 1997

| | | ----------Size---------- | | | --------Cull-------- | | | | | | --------Yield------- | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | Source | % Small | % Medium | % Large | % Forks | % Cracks | Length in. | Diameter in. | % Bolted | Stand plants/ft | Ton/A Total | Ton/A Usable |
| SDC 1374 | CP | 1.1 | 41.2 | 57.7 | 12.4 | 2.7 | 6.9 | 1.7 | 1.5 | 8.7 | 24.4 | 18.2 |
| SDC 1443 | CP | 0.5 | 35.5 | 64.0 | 7.5 | 3.6 | 6.6 | 1.9 | 0.8 | 10.3 | 30.3 | 23.6 |
| SDC 1682 | CP | 0.7 | 45.4 | 53.9 | 9.3 | 3.7 | 7.2 | 1.7 | 0.9 | 9.2 | 28.4 | 22.2 |
| Calgary | BZ | 1.2 | 32.8 | 66.0 | 7.4 | 5.3 | 6.6 | 2.0 | 1.8 | 8.1 | 28.3 | 23.2 |
| Carson | BZ | 0.4 | 28.7 | 70.9 | 6.3 | 0.6 | 5.9 | 1.9 | 0.8 | 9.2 | 28.8 | 25.1 |
| Fayette | BZ | 0.7 | 52.1 | 47.2 | 5.5 | 1.1 | 7.8 | 1.6 | 0.5 | 10.3 | 28.3 | 22.4 |
| Ireland | BZ | 0.9 | 45.5 | 53.6 | 8.8 | 6.4 | 8.5 | 1.5 | 0.5 | 6.9 | 22.6 | 17.6 |
| Kamaran | BZ | 1.0 | 48.8 | 50.2 | 9.0 | 3.6 | 7.8 | 1.6 | 1.0 | 9.7 | 29.2 | 22.8 |
| Nandrin | BZ | 0.3 | 51.9 | 47.8 | 5.1 | 7.4 | 7.5 | 1.5 | 0.5 | 8.1 | 30.8 | 20.6 |
| Napa | BZ | 1.5 | 60.2 | 38.3 | 5.1 | 10.2 | 7.1 | 1.5 | 0.5 | 10.5 | 31.4 | 19.4 |
| Nashville | BZ | 1.1 | 62.4 | 36.5 | 14.2 | 5.5 | 8.0 | 1.4 | 0.7 | 10.5 | 27.3 | 19.1 |
| Nevis | BZ | 1.5 | 62.4 | 36.0 | 6.7 | 8.0 | 6.9 | 1.4 | 0.5 | 9.4 | 24.9 | 16.2 |
| Goliath | PS | 0.6 | 44.0 | 55.4 | 6.2 | 6.5 | 7.0 | 1.7 | 1.6 | 9.5 | 25.9 | 21.1 |
| Early Gold | PS | 0.2 | 22.3 | 77.5 | 12.8 | 12.3 | 7.3 | 2.0 | 3.4 | 5.2 | 24.1 | 16.1 |
| Gold King | RG | 0.8 | 25.9 | 73.3 | 8.9 | 6.4 | 6.6 | 2.0 | 0.6 | 9.2 | 31.4 | 22.6 |
| PX 2890 | PS | 0.5 | 36.7 | 62.8 | 7.8 | 13.4 | 6.0 | 1.8 | 6.8 | 9.8 | 30.2 | 17.7 |
| PX 2590 | PS | 0.4 | 17.5 | 82.1 | 11.9 | 10.6 | 5.9 | 2.1 | 0.5 | 8.1 | 34.2 | 23.4 |
| | Average | 0.8 | 42.0 | 57.2 | 8.5 | 6.3 | 7.0 | 1.7 | 1.3 | 9.0 | 28.3 | 20.7 |

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**Size: % by weight. Small=diameter < 0.75 inch, Medium= 0.75 to 1.5 inch, Large=diameter>1.5 inch**

**Yield: These values should be interpreted as potential yield over an entire acre. Grower yields may differ due to variations in field conditions, cultural practices or other factors.**

Table 5a. Yield and Characteristics of Processing Carrot Cultivars harvested on November 5. OARDC, Fremont, OH - 1997

| | | ----------Cull---------- | | | | Crown | Diameter | --------Yield------- | |
|---|---|---|---|---|---|---|---|---|---|
| | | % | % | % | Length | Diameter | 6" below | Ton/A | Ton/A |
| Variety | Source | Fork | Crack | Short<4" | in. | in. | crown | Total | Usable |
| SDC 1374 | CP | 20.2 | 10.0 | 0.7 | 8.5 | 2.4 | 1.7 | 39.4 | 24.0 |
| SDC 1443 | CP | 6.2 | 1.1 | 2.7 | 8.1 | 2.5 | 1.6 | 34.9 | 31.2 |
| SDC 1682 | CP | 16.2 | 8.3 | 0.8 | 9.0 | 2.3 | 1.8 | 37.3 | 25.2 |
| Calgary | BZ | 10.4 | 12.7 | 7.6 | 8.6 | 2.5 | 1.8 | 36.8 | 24.4 |
| Carson | BZ | 9.5 | 6.6 | 2.0 | 7.7 | 2.7 | 1.9 | 41.8 | 31.4 |
| Fayette | BZ | 7.0 | 4.1 | 3.1 | 9.1 | 2.4 | 1.9 | 35.7 | 30.0 |
| Ireland | BZ | 10.2 | 11.8 | 2.4 | 10.4 | 1.9 | 1.5 | 34.2 | 24.3 |
| Kamaran | BZ | 10.5 | 10.1 | 1.9 | 9.5 | 2.2 | 1.8 | 41.7 | 30.7 |
| Nandrin | BZ | 7.4 | 16.7 | 2.9 | 9.7 | 1.9 | 1.9 | 37.5 | 25.6 |
| Napa | BZ | 13.0 | 27.2 | 3.6 | 9.1 | 2.0 | 1.8 | 41.9 | 21.0 |
| Nashville | BZ | 13.9 | 9.1 | 7.0 | 9.5 | 1.9 | 1.5 | 36.9 | 22.7 |
| Nevis | BZ | 7.5 | 24.7 | 7.4 | 9.0 | 2.0 | 1.7 | 40.4 | 23.1 |
| Goliath | PS | 7.4 | 6.5 | 2.5 | 8.3 | 2.4 | 1.8 | 39.7 | 29.5 |
| Early Gold | PS | 15.5 | 11.2 | 3.2 | 8.7 | 2.7 | 1.9 | 31.9 | 20.6 |
| Gold King | RG | 10.3 | 5.9 | 3.9 | 7.6 | 2.5 | 1.6 | 44.4 | 35.6 |
| PX 2890 | PS | 8.5 | 32.8 | 4.4 | 7.8 | 2.4 | 1.6 | 37.2 | 17.4 |
| PX 2590 | PS | 13.8 | 28.8 | 5.9 | 6.7 | 2.5 | 1.7 | 43.8 | 18.5 |
| | Average | 11.0 | 13.4 | 3.6 | 8.6 | 2.3 | 1.7 | 38.6 | 25.6 |

**Each value is the mean of 3 replicates.**

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**% Fork, Crack, Short: based on count**

**Length and Diameter: measured on a sample of 10 representative roots**

**Yield: Calculated from an area 5 ft. x 15 ft. in each replicate.**

**These values should be interpreted as potential yield over an entire acre. Grower yields may differ due to variations in field conditions, cultural practices or other factors.**

Table 5b. Quality Characteristics of Processing Carrot Cultivars harvested on November 5. OARDC - Fremont, Ohio - 1997

| Variety | Source | Sol. Solids BRIX | % Core | Depth of Green in. | Smooth-ness | Comments |
|---|---|---|---|---|---|---|
| SDC 137 | CP | 9.2 | 59.1 | 0.4 | 1 | Chanteney, broad shoulder, tapered, blunt end, smooth, uniform internal color |
| SDC 144 | CP | 9.1 | 59.4 | 0.0 | 1 | Chanteney, broad shoulder, tapered, blunt end, uniform color, somewhat flat |
| SDC 168 | CP | 9.2 | 59.3 | 0.0 | 2 | Nantes, broad shoulder, tapered, pointed tip |
| Calgary | BZ | 9.4 | 54.8 | 0.0 | 2 | Chanteney, broad shoulder, pointed tip |
| Carson | BZ | 9.8 | 62.4 | 0.3 | 2 | Chantenay, broad shoulder, short, blunt tip |
| Fayette | BZ | 8.9 | 53.5 | 0.0 | 2 | Nantes, long, cylindrical, slight taper |
| Ireland | BZ | 9.5 | 55.7 | 0.2 | 2 | Imperator, long, tapered, pointed end |
| Kamaran | BZ | 9.4 | 50.3 | 0.4 | 1 | Imperator, long, narrow shoulder, medium orange color |
| Nandrin | BZ | 8.7 | 56.9 | 0.9 | 2 | Nantes, long, medium, straight, some rough surface, some crooked, blunt tip |
| Napa | BZ | 8.6 | 46.0 | 0.5 | 2 | Nantes/Imperator, long, slender, tapered, blunt tip |
| Nashville | BZ | 8.6 | 49.5 | 0.9 | 1 | Nantes, long, slender, tapered, smooth |
| Nevis | BZ | 9.2 | 53.2 | 0.9 | 1 | Nantes/Imperator, narrow shoulder, straight, tapered |
| Goliath | PS | 8.3 | 57.0 | 0.5 | 1 | Chanteney/Danvers, some rough, thick core, good color, slight taper |
| Early Gol | PS | 8.3 | 55.9 | 0.2 | 2 | Chanteney, broad shoulder, tapered |
| Gold King | RG | 9.0 | 51.9 | 0.5 | 2 | Chanteney, pale cambium, broad shoulder, tapered |
| PX 2890 | PS | 8.0 | 52.9 | 0.4 | 1 | Chanteney, broad shoulder, pale cambium, uniform, purple shoulders, blunt tip |
| PX 2590 | PS | 8.4 | 59.9 | 0.1 | 2 | Chanteney, pale cambium, broad shoulder, blunt tip, tapered |
| | **Average** | 8.9 | 55.2 | 0.4 | | |

**Each value is the mean of 3 replicates.**

**Source: CP=Campbell's Seeds, BZ=Bejo Zaden, PS=Petoseed, RG=Rogers**

**Smoothness Rating: 1=smooth, 2=medium, 3=rough**

**% Core: % of cross section diameter occupied by the core**

**Soluble solids: Degrees Brix, average of three measurements**

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